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Filed : February 28, 2002

REMARKS

By way of summary, Claims 1-36 were pending in this application. No new claims are added herein. Claims 1, 13, 14, 16, 17, and 26 are amended herein. Accordingly, Claims 1-36 remain pending for consideration.

As stated in the prior response, this application is directed to shrouds, head-stack assemblies, and disk drives. A disk drive has at least one disk housed within an enclosure. The disk spins during operation, which generates airflow within the enclosure. The airflow impinges upon components, such as at least one actuator arm and a flex cable that conveys signals to and from at least one read/write head coupled with the actuator arm. The flex cable has a spanning portion that extends between the actuator arm and a structure that secures a portion of the flex cable to the enclosure. The spanning portion is *unrestrained* between the actuator arm and the structure that secures a portion of the flex cable. In other words, the spanning portion is not completely immobilized. The spanning portion is able to move as the actuator arm moves through its stroke. The spanning portion of the flex cable also is exposed to the airflow generated by the spinning disk, which airflow impinges upon the spanning portion. The impinging airflow induces vibrations in the unrestrained spanning portion of the flex cable (and in the actuator arm, as previously discussed). The vibrations propagate to the read/write head and can cause significant movement of the read/write head relative to a track on the disk. Such movement can render the disk drive non-functional, particularly if the disk drive has relatively high track density.

This application discloses disk drives that have shrouds that at least partially shield the spanning portion of the flex cable, the actuator arm, or the spanning portion of the flex cable and the actuator arm from the airflow. The spanning portion is shielded without being completely restrained.

Claim Indicated as Being Allowable

Applicants thank the Examiner for the indication that Claim 15 is in condition for allowance.

Amendment to the Specification

In the first office action, the Examiner requested that a new title be given to the application. Applicants amended the title in the *Response to Office Action Mailed September 12, 2003*, to read "DISK DRIVE HAVING A SHROUD ASSEMBLY FOR

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SHIELDING AT LEAST ONE OF A FLEX CABLE AND AN ACTUATOR ARM.” The summary of the Office Action indicates that the specification is objected to, but no objection is discussed in the body of the Office Action. Applicants respectfully request the Examiner to formally withdraw the objection to the title detailed in the first office action.

Rejection of Claims 1, 2, 5-14, and 16-36 Under 35 U.S.C. § 102 in View of Wood

The Examiner rejects Claims 1, 2, 5-14, and 16-36 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,907,453 to Wood et al. (Wood). Although Applicants disagree with the Examiner’s characterization of Wood, Applicants have amended Claims 1, 13, 14, 16, 17, and 26 to clarify the distinction between these claims and Wood to expedite allowance of the application.

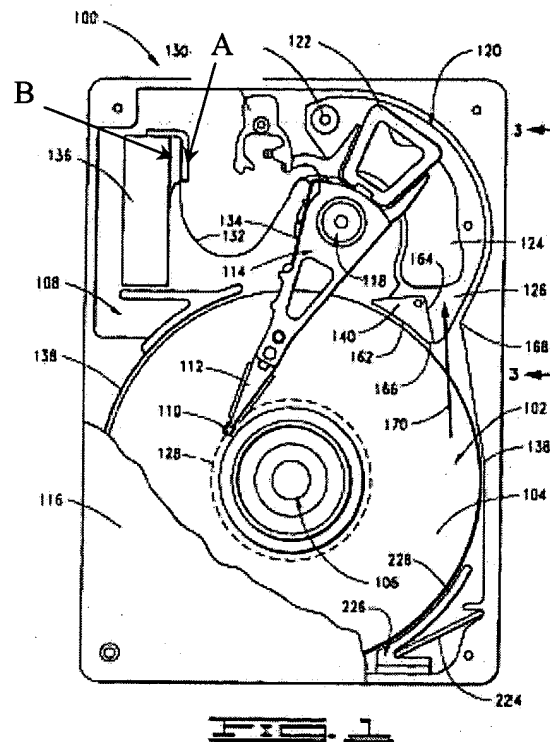
Wood

Wood does not have any structure that shields a spanning portion of a flex cable, which is a portion of the flex cable that extends unrestrained between an actuator assembly and a structure that secures the flex cable to a disk drive enclosure. As previously discussed, the spanning portion is exposed to airflow generated by the spinning disk. Figure 1 of Wood discloses a disk drive 100 that includes a plurality of disks 104 that are mounted to a spindle motor 106 for rotation. An actuator assembly 114 is pivoted about a bearing assembly 118 in a conventional manner by a voice coil motor (VCM) 120 to position heads 110 that write to the disks 104. The VCM 120 includes a coil 122. A flex assembly 132 is electrically connected to the actuator assembly 114 and terminates at a flex bracket 136.

The Examiner asserts in the Office Action that a “cable shrouding portion, which is apart of mounting portion 136, is configured to shield a spanning portion of the flex cable 132 between the cable mounting portion and the actuator assembly 114 from airflow generated by the rotation of the rotatable disk 104.” The Examiner refers to Column 5, lines 20-24 of Wood, which state “[t]he flex assembly 132 terminates at a flex bracket 136 for communication through the base deck 108 to a disc drive printed circuit board (not shown) mounted to the bottom side of the disc drive 100.”

Applicants initially note that Wood does not provide details of the bracket 136, other than the single sentence set forth above. Moreover, the bracket 136 is shown only in Figure 1, only in top plan view. Therefore, many aspects of the bracket 136 (e.g., its height compared to that of the flex assembly 132) are not ascertainable from Wood. However,

Figure 1 shows that the bracket 136 is substantially entirely located downstream of the flex assembly 132. (The direction of the airflow in the Wood disk drive is indicated by arrow 170 in Figure 1.) Thus it is not apparent how the bracket 136 can shield the flex assembly 132. The only portion of Wood that arguably could shield a portion of the flex assembly 132 is shown in Figure 1 in the upper right-hand corner of the bracket 136, indicated below by an arrow labeled "A". A portion of the flex assembly 132 appears to extend between the portion A and a portion labeled by an arrow "B".



However, the portion of the flex assembly 132 that lies between the portion A and the portion B of the bracket 136 appears to be *restrained* by the portions A and B. The curved portion of the flex assembly 132 proximate the number "132" and the corresponding lead line is not restrained by the bracket 136. The bracket 136 of Wood does not shield this portion of the flex assembly 132. Thus, as discussed above, Wood does not have any structure that shields a spanning portion (i.e., an unrestrained portion of a flex cable) that extends between an actuator assembly and a structure that secures the flex cable to a disk drive enclosure.

Claims 1, 2, and 5-12

Although the flex bracket 136 of Wood does not appear to shield a spanning portion of the flex cable between the cable mounting portion and the actuator assembly

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from airflow generated by the rotation of the rotatable disk, Applicants have amended Claim 1 in order to expedite allowance of the application. Amended Claim 1 recites, among other limitations, a shroud assembly comprising:

a cable mounting portion comprising a first surface and a second surface, *the first surface configured to receive and to restrain a transition portion* of the flex cable proximate to the second end, the second surface configured to receive the second end of the flex cable and to position the second end for engagement by the printed circuit board; and

a cable shrouding portion configured to shield a spanning portion of the flex cable between the cable mounting portion and the actuator assembly from airflow generated by the rotation of the rotatable disk;

wherein the spanning portion of the flex cable is unrestrained by the cable shrouding portion when the shroud assembly is applied to the disk drive.

As discussed above, Wood does not teach or suggest at least these limitations of Claim 1. Therefore, Applicants respectfully submit that Claim 1 is patentably distinguished over Wood, and Applicants request allowance of Claim 1. Claims 2 and 5-12 depend from Claim 1 and further define the invention defined in Claim 1. For at least the reasons set forth above with respect to Claim 1, Applicants respectfully submit that Claims 2 and 5-12 are patentably distinguished over Wood. Claims 2 and 5-12 also are patentably distinguished over Wood in view of the additional limitations defined in each of the claims. Therefore, Applicants respectfully request allowance of Claims 2 and 5-12.

Claim 13

Claim 13 also recites a shroud assembly for a disk drive. The shroud comprises, among other limitations,

a cable mounting portion comprising a first surface and a second surface, *the first surface configured to receive and to restrain a transition portion* of the flex cable proximate to the second end, the second surface configured to receive the second end of the flex cable

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and to position the second end for engagement by the printed circuit board;

a cable shrouding portion configured to shield a spanning portion of the flex cable between the cable mounting portion and the actuator assembly from airflow generated by the rotation of the rotatable disk; and . . .

wherein the spanning portion of the flex cable is unrestrained by the cable shrouding portion when the shroud assembly is applied to the disk drive.

As discussed above, Wood does not teach or suggest at least these limitations of Claim 13. Therefore, Applicants respectfully submit that Claim 13 is patentably distinguished over Wood, and Applicants request allowance of Claim 13.

Claim 14

Similarly, Claim 14 recites a shroud assembly for a disk drive. The shroud assembly comprises, among other limitations, "a cable shrouding portion configured to shield a spanning portion of the flex cable between the actuator assembly and the printed circuit board from airflow generated by the rotation of the rotatable disk . . . *wherein the spanning portion of the flex cable is unrestrained by the cable shrouding portion when the shroud assembly is applied to the disk drive.*" As discussed above, Wood does not teach or suggest at least these limitations of Claim 14. Therefore, Applicants respectfully submit that Claim 14 is patentably distinguished over Wood, and Applicants request allowance of Claim 14.

Claim 16

Claim 16 recites a shroud assembly for a disk drive. The shroud includes, among other limitations:

a cable mounting portion comprising a first surface and a second surface, *the first surface configured to receive and to restrain a transition portion* of the flex cable proximate to the second end, the second surface configured to receive the second end of the flex cable and to position the second end for engagement by the printed circuit board; and

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a cable shrouding portion integrally formed with the cable mounting portion, the cable shrouding portion configured to shield a spanning portion of the flex cable between the cable mounting portion and the actuator assembly from airflow generated by the rotation of the rotatable disk;

wherein the spanning portion of the flex cable is unrestrained by the cable shrouding portion when the shroud assembly is applied to the disk drive.

Wood does not teach or suggest at least these limitations of Claim 16. Therefore, Applicants respectfully submit that Claim 16 is patentably distinguished over Wood, and Applicants request allowance of Claim 16.

Claims 17 – 25

Claim 17 recites a head-stack assembly for a disk drive. The head-stack assembly comprises, among other limitations, a shroud assembly comprising, among other limitations:

a cable mounting portion comprising a first surface and a second surface, *the first surface configured to receive and to restrain a transition portion* of the flex cable proximate to the second end, the second surface configured to receive the second end of the flex cable and to position the second end for engagement by the printed circuit board; and

a cable shrouding portion configured to shield a spanning portion of the flex cable between the cable mounting portion and the actuator assembly from airflow generated by the rotation of the rotatable disk;

wherein the spanning portion of the flex cable is unrestrained by the cable shrouding portion when the shroud assembly is applied to the disk drive.

Wood does not teach or suggest at least these limitations of Claim 17. Therefore, Applicants respectfully submit that Claim 17 is patentably distinguished over Wood, and Applicants request allowance of Claim 17. Claims 18-25 depend from Claim 17 and further define the invention defined in Claim 17. For at least the reasons set forth above with respect to Claim 17, Applicants respectfully submit that Claims 18-25 are patentably

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distinguished over Wood. Claims 18-25 also are patentably distinguished over Wood in view of the additional limitations defined in each of the claims. Therefore, Applicants respectfully request allowance of Claims 18-25.

Claims 26-36

Claim 26 recites a disk drive comprising, among other limitations a shroud assembly comprising, among other limitations:

a cable mounting portion comprising a first surface and a second surface, *the first surface configured to receive and to restrain a transition portion* of the flex cable proximate to the second end, the second surface configured to receive the second end of the flex cable and to position the second end for engagement by the printed circuit board; and

a cable shrouding portion configured to shield a spanning portion of the flex cable between the cable mounting portion and the actuator assembly from airflow generated by the rotation of the rotatable disk;

wherein the spanning portion of the flex cable is unrestrained by the cable shrouding portion when the shroud assembly is applied to the disk drive.

Wood does not teach or suggest at least these limitations of Claim 26. Therefore, Applicants respectfully submit that Claim 26 is patentably distinguished over Wood, and Applicants request allowance of Claim 26. Claims 27-36 depend from Claim 26 and further define the invention defined in Claim 26. For at least the reasons set forth above with respect to Claim 26, Applicants respectfully submit that Claims 27-36 are patentably distinguished over Wood. Claims 27-36 also are patentably distinguished over Wood in view of the additional limitations defined in each of the claims. Therefore, Applicants respectfully request allowance of Claims 27-36.

Rejection of Claims 3 and 4 Under 35 U.S.C. § 103 in view of Wood

The Examiner rejects Claims 3 and 4 under 35 U.S.C. § 103 as being unpatentable over Wood. The Examiner notes that Wood is silent as to the limitations recited in Claims 3 and 4. The Examiner also asserts that the subject matter of these claims would have been obvious to one of skill in the art. As discussed above, Applicants respectfully assert that

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Wood fails to teach or suggest the limitations of amended Claim 1. Claims 3 and 4 depend from Claim 1 and further define the invention defined in Claim 1. For at least the reasons set forth above with respect to Claim 1, Applicants respectfully submit that Claims 3 and 4 are patentably distinguished over Wood. Claims 3 and 4 also are patentably distinguished over Wood in view of the additional limitations defined in each of the claims. Therefore, Applicants respectfully request allowance of Claims 3 and 4.


CONCLUSION

For the foregoing reasons, Applicants respectfully submit that the present application is in condition for allowance, and Applicants respectfully request that a Notice of Allowance be issued at the earliest opportunity.

Respectfully submitted,

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